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Logical analysis of the purpose of teaching--to bring about appropriate changes in learners--should result in identification of the elements of teaching behavior which effects appropriate changes. These elements are the logical objectives for a program of teacher education and the criteria for assessing teacher effectiveness. By successively defining the largest meaningful components at each stage of analysis, the analyst insures that he will define all the components he can conceptualize and identify all the possible relationships of those components. Teacher educators and teaching evaluators subjectively decide to terminate analysis when further analysis is not justified in terms of cost and effort. Then, for each significant element of the total behavior, learning systems can be devised to enable future teachers to be effective. This total model of defining objectives, criteria, and learning systems for teacher education is itself a system, which possesses self-correction capability through the analyst's continual reexamination of his judgments. (This document is an expansion of the model for task analysis, Sp 002 162, entitled "Appendix H. Sample Task Analysis: Behavioral Objectives for ComField Laboratory" in SP 002 154, A COMPETENCY BASED, FIELD CENTERED, SYSTEMS APPROACH TO ELEMENTARY TEACHER EDUCATION. VOLUME I: OVERVIEW AND SPECIFICATIONS. FINAL REPORT.) (Author/SG)

A SYSTEMATIC APPROACH TO THE ANALYSIS OF A NON-SYSTEMATIC PROCESS

(Herbert Hite, Washington State University)

The performance of the able classroom teacher appears anything but systematic or scientific. We observe that the teacher interacts with pupils in such a way that particular teaching behaviors blur into a single act. The effective teacher seems to perceive, make decisions, execute these decisions, assess the results and make new decisions so rapidly that the essence of this interaction seems to be intuitive. Evaluation and analysis of this act, however, are processes which by their very nature must be systematic. The anamoly is that a process which at its best appears to be uniquely human and non-systematic can probably be improved by a strictly disciplined, systematic approach.

What follows is a description of an approach to the evaluation of teaching in which (1) some principles of systems analysis are applied to identifying components of the teaching act, and (2) these components are defined as objectives for the education of teachers and then as criteria for assessing teaching. To illustrate the systems approach, we will refer to a model for teacher education and evaluation which is being developed to implement new guidelines for teacher education in Washington State.[1] The same model is part of the ComField Project—specifications for an exemplar program to educate elementary teachers.[2]

Systematic Analysis of the Teaching Act

The process of analysing is a process of taking apart. The analysis of teaching is to take apart what we define as teaching. Systematic analysis requires that the analyst identify all the components of the

object for analysis, and that he describe all the relationships of these components. Analysis is an operation carried out by human analysts, of course, so the requirements of systematic analysis must be accepted as goals rather than as descriptions of the process in action.

First, Define the Ultimate Product

The first step in systems analysis is to describe as specifically as possible what is to be the ultimate goal of the system. In this case, we are to analyze teaching, so the ultimate goal is effective teaching. The term teaching, however, is one which includes a number of roles and is not a specific enough term for our purposes. The term, teaching, as commonly used may describe the actions of persons who decide who is to be taught, or what is to be taught; or it may describe the actions of persons who guide learners in face-to-face situations.

In the model of teaching, which is the example of the analysis process in this description, the purpose of teaching is to bring about learning. This modest aim is not the universal goal of American Education. More often the purposes of teaching may really be such administrative aims as classification of pupils, or moving pupils of a certain age through a grade and content area in a given amount of time. When we define the purpose of teaching as bringing about learning, we set the major parameters for evaluation of teaching.

In this model the ultimate product is the Effective Instructional Manager--one who elicits appropriate changes in the behavior of learners. This description of behavior is perhaps a first step in analysis because the statement limits the term, teacher, to a particular role. Other roles might be those of instructional analyst, instructional designer, etc. In general terms, the ultimate criteria of effective instructional management is that pupils <u>do</u> demonstrate appropriate changes in behavior.

The term behavior as used here includes both overt and covert behavior, and is intended to encompass everything the human organism is capable of doing.

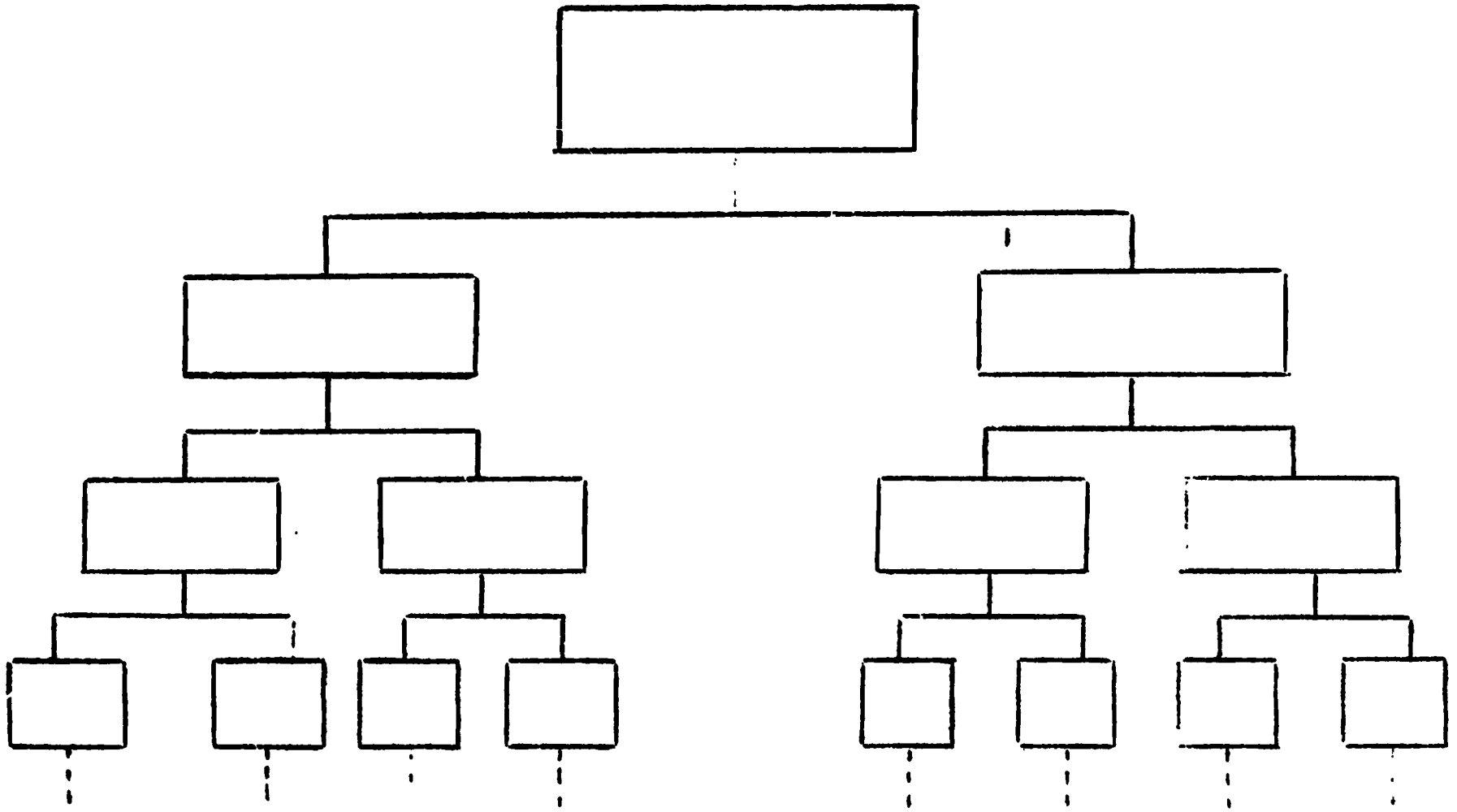
The Discipline of Systematic Analysis

Having defined the product of our system in behavioral terms, our next step is to take apart this product into the largest, meaningful components we can perceive.

There is a discipline to systematic analysis which requires that we attempt to define all the components and define all the relationships of these components. These requirements dictate that at each level of analysis--each time we take apart the product, or products--we define the largest components which we find to be meaningful elements of the original product. By always attempting to identify the largest components, we insure that we will "touch all bases", or not miss meaningful parts to the whole. This identification of largest components also guarantees that we will successively fit these components together in the several possible relationships which exist, or at least as we can perceive them. The ideal systematic analysis would result in precisely two components of each product. Two components would be the largest components of one product. An ideal model of systems analysis, then, would be a binary model. In practice, our perceptions do not always result in two, meaningful components each time we analyze a given product. The ideal model simply tells us that our judgement is probably fallible, and that other attempts at analysis should be undertaken in the future.

A system always includes some self-correcting capability. In the process of systems analysis we have a built-in assessment system which asks these questions each time we take apart an object: Are these really

IDEAL SYSTEMS ANALYSIS MODEL



descriptions of the largest meaningful components? (and) Do the components, taken as a whole, equal the original? Human analysts are always limited by the information, or imput, with which they work and their capabilities to conceptualize. These limitations simply mean that when the analyst takes apart an object into components he makes a tentative set of judgements, and assumes that he will make different judgements given further information and increased capability to conceptualize. The array of components, however, if systematically identified, always tells him how a given judgement relates to the whole system.

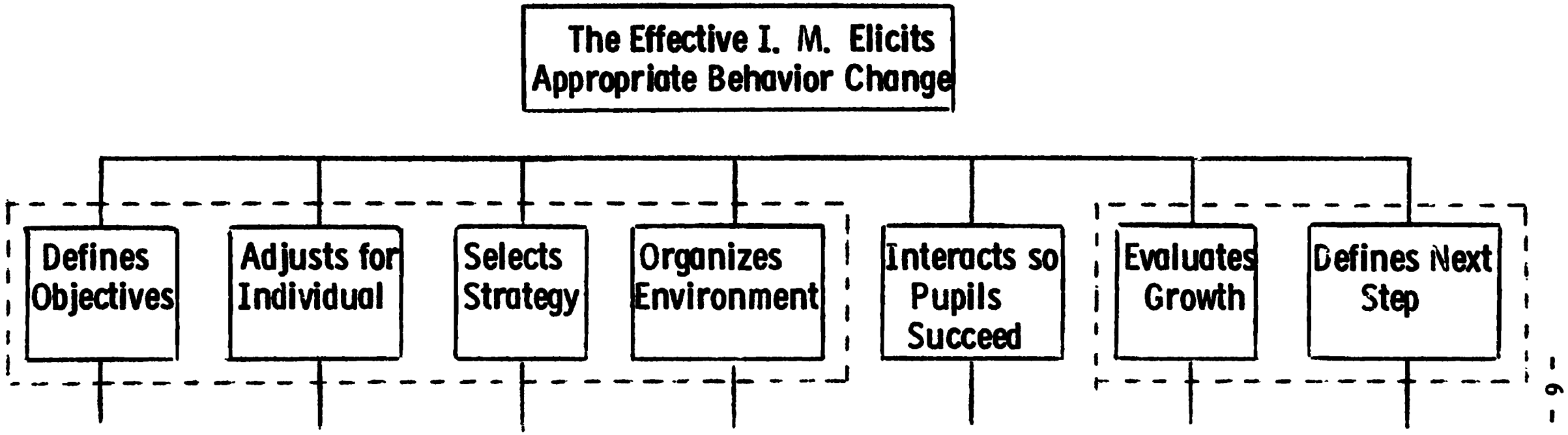
First Level of Analysis

In the model which is our example the ultimate object of analysis--the Effective Instructional Manager--was first taken apart into seven major components. The analysts worked from information which consisted of abstracts of the literature on the research on teaching which was available to them in a three-months period. Their collective judgement was that the literature suggested these seven components of the behavior--elicits appropriate behavior change:

(The Effective Instructional Manager:)

1. Defines objectives
2. Adjusts objectives for classes of individual differences
3. Selects instructional strategies
4. Organizes the learning environment
5. Interacts with learners so that they achieve the objectives
6. Evaluates changes in behavior
7. Decides on the appropriate next instructional step

These seven components are the first level of analysis in our model. They were conceived as not two, but seven components. The analysts might have conceived of two components such as (1) planning to elicit behavior


The Effective I. M. Elicits Appropriate Behavior Change
Defines Objectives
Adjusts for Individual
Selects Strategy
Organizes Environment
Interacts so Pupils Succeed
Evaluates Growth
Defines Next Step

changes and (2) executing the plan. The analysis which would have resulted from these two components might be quite different in terms of relationships but might eventually define the same specifics. The seven components were percieved as the largest meaningful components of this taking-apart process and describe the same behavior as that in the top box of the diagram. The task force who did the analysis, however, reserve the right to revise the analysis on the basis of further information and later perceptions. (The analysts lately have suggested that the seven components might be conceived of as three--planning, executing the plan, and assessing results. Dotted lines in the diagram show this three-component alternative.)

Second Level of Analysis

The second level of analysis is carried out by taking apart what resulted from the first level of analysis. The same requirements for analysis apply. In the model which is our example, the following components were identified as second-level products of analysis:

1. For defines objectives,
    a. State objectives in operational terms,
    b. Justifies the choice of a particular objective
2. For adjusts objectives for individual learners' requirements,
    a. Determines prerequisites for the objective,
    b. Devises alternative objectives for different learners according to the prerequisites they possess for the task
3. For selects instructional strategies,
    a. Selects media appropriate to objective
    b. Selects learning activities appropriate to objective
4. For organizes learning environment,
    a. Defines a sequence of activities

b. Manipulates the physical elements of the environment to fit the planned activities

5. For interacts with pupils,

a. Elicits responses from learners

b. Reinforces responses of learners appropriately

6. For evaluates growth,

a. Appraises changes in behavior

b. Provides learners knowledge of the results of their behavior

7. For defines next step,

a. Re-cycles so that learners may improve

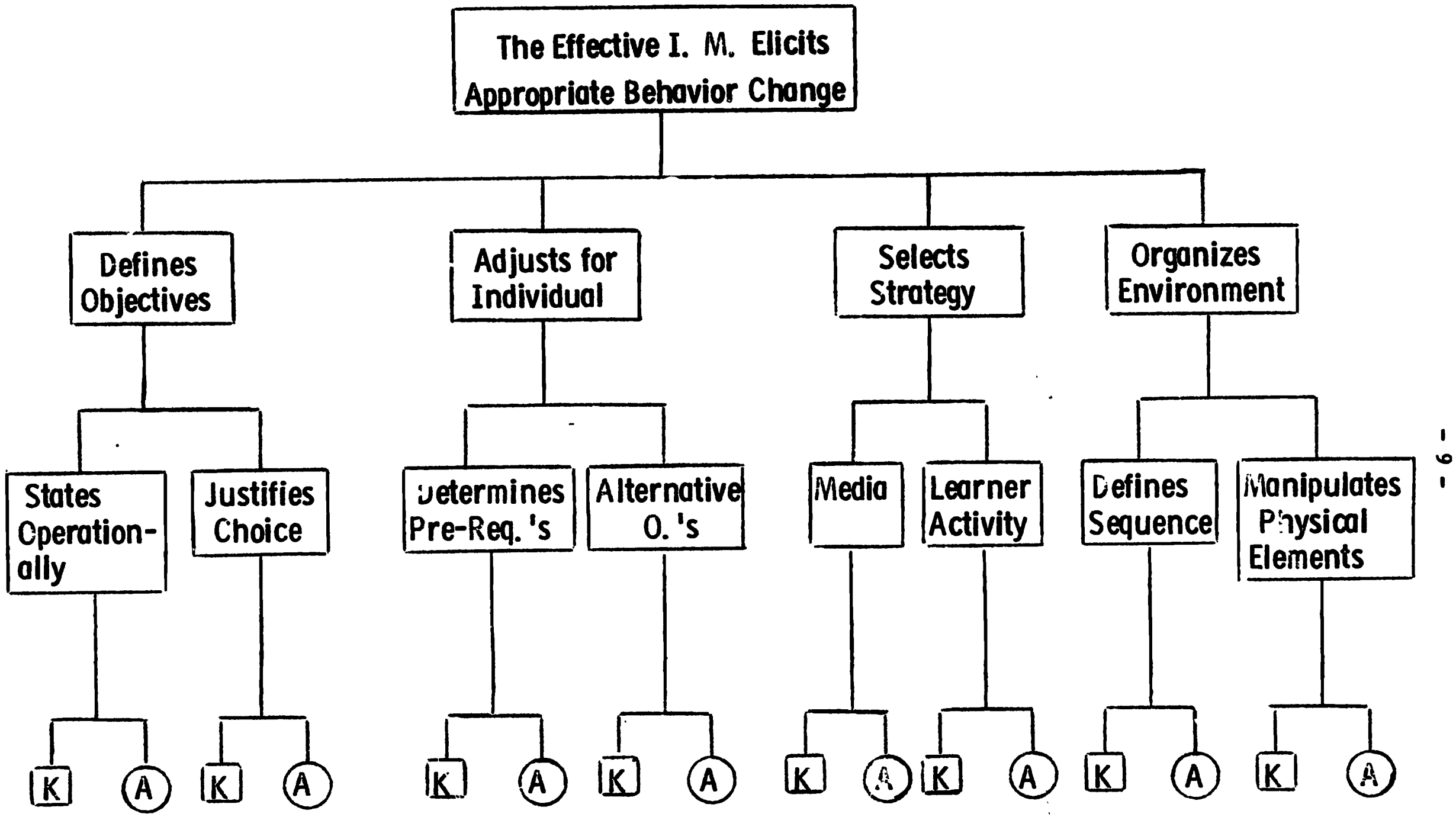
b. Defines next objective

This whole set of second-order components must equal the original top box--elicits appropriate changes in behavior. Again, this set of components represents a set of judgements which can, and should, be revised as the imput for making the judgements changes.

When To Stop the Analysis Process

The taking-apart process may be repeated almost indefinitely. In this model we break out components until we decide subjectively that we have identified "Tasks". These Tasks are manageable pieces of the total behavior of the Effective Instructional Manager. Each Task includes a knowledge component and an application component. They represent what we conceive of as major steps to be taken by the student becoming an Effective Instructional Manager. They may then become the general descriptions of courses, units, or learning systems. Each Task may be stated also as a criterion for evaluating teaching.

Components of the Tasks, in this model, are the learning activities which the student of teaching performs in attaining the objective of the


The Effective I. M. Elicits Appropriate Behavior Change
Defines Objectives
Adjusts for Individual
Selects Strategy
Organizes Environment
States Operation-ally
Justifies Choice
Determines Pre-Req. 's
Alternative O. 's
Media
Learner Activity
Defines Sequence
Manipulates Physical Elements
K
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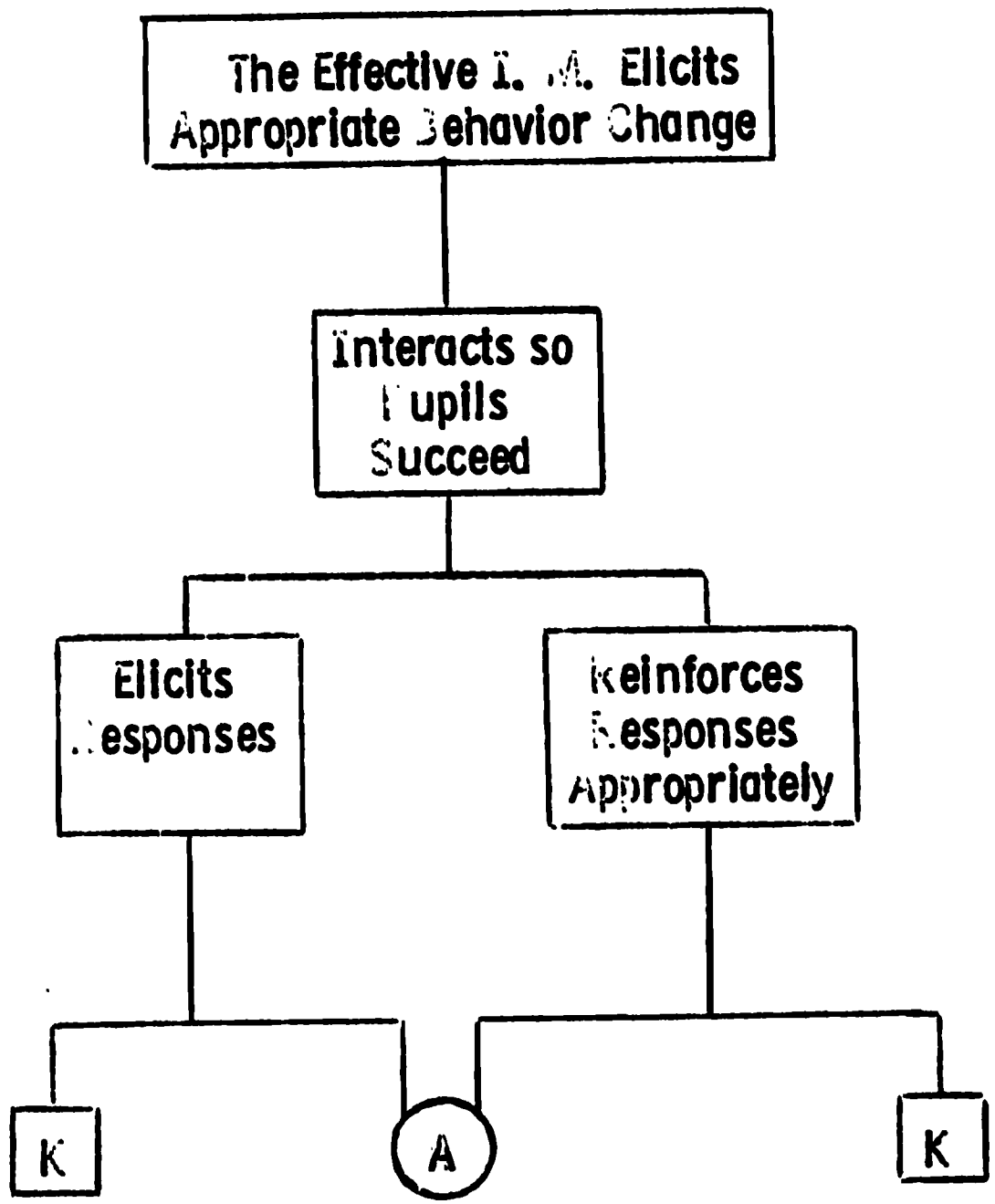
The Effective I. M. Elicits Appropriate Behavior Change
Interacts so Pupils Succeed
Elicits Responses
Reinforces Responses Appropriately
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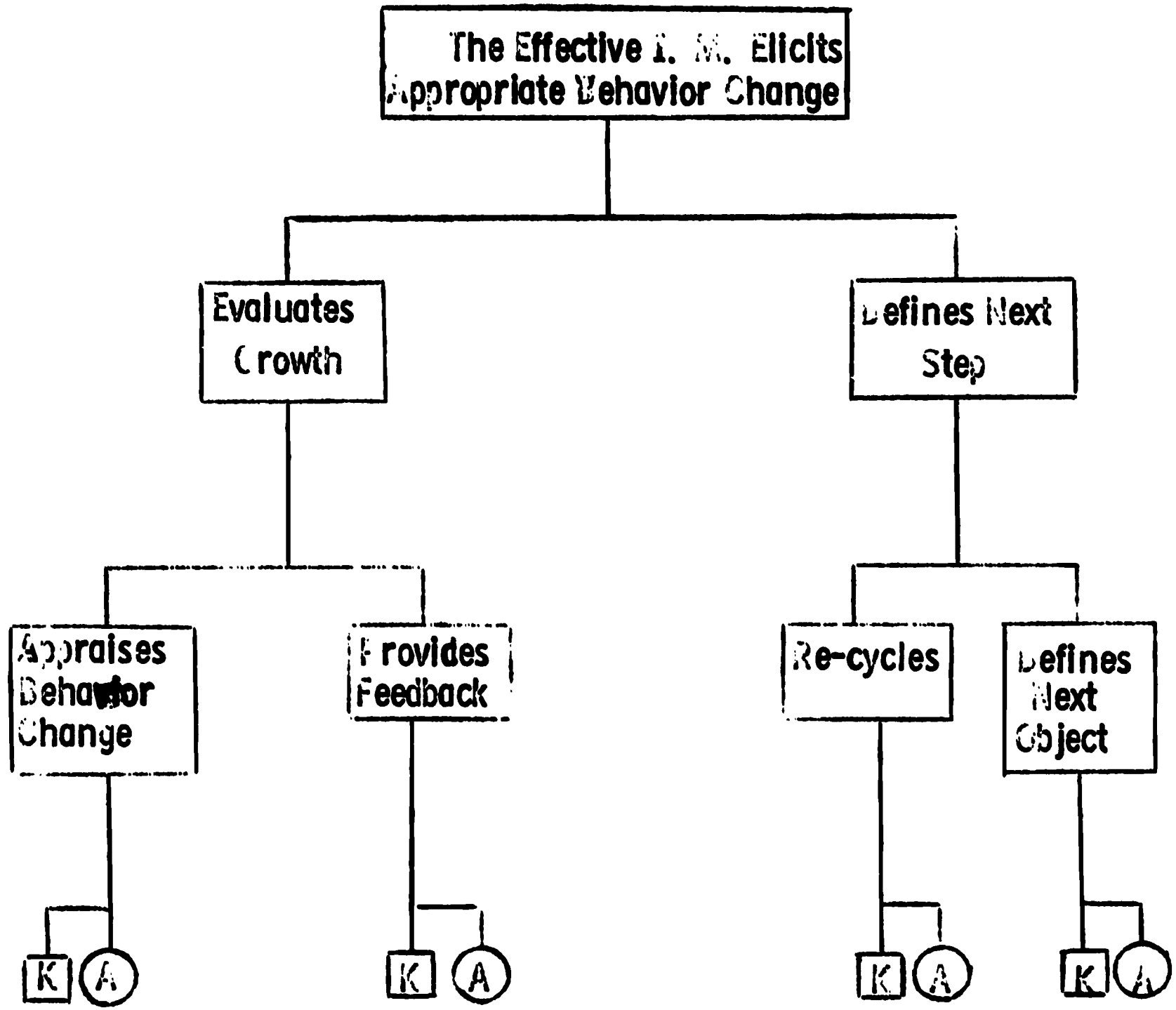
The Effective I. M. Elicits Appropriate Behavior Change
Evaluates Growth
Defines Next Step
Appraises Behavior Change
Provides Feedback
Re-cycles
Defines Next Object
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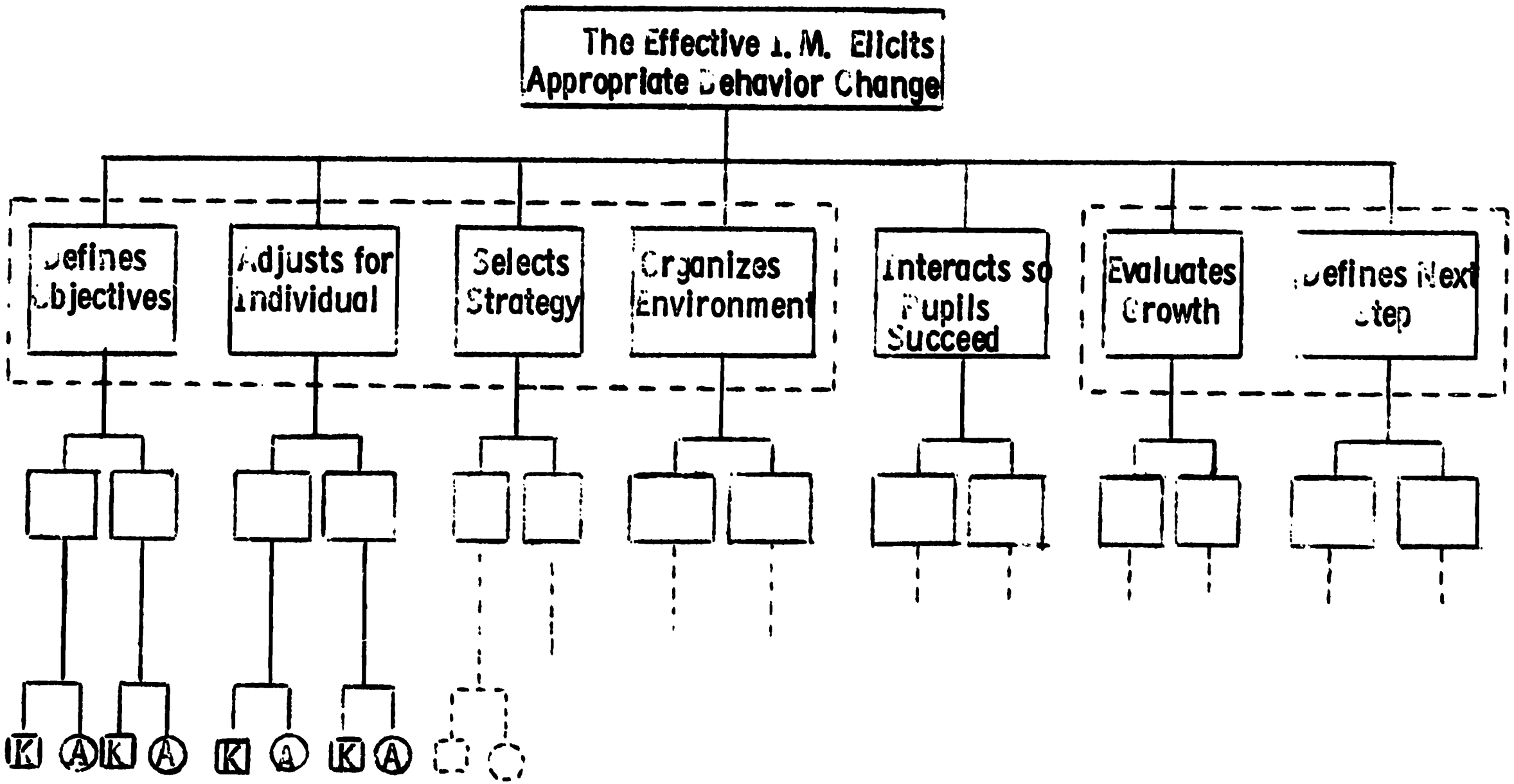
Task. Identification of these learning activities is accomplished by the systematic analysis process we have already described. The analysis process may be continued to the point that analysts identify steps in linear programs within learning activities within learning systems. At some point, the analyst decides that further taking apart of components is not justified in terms of costs and energy. The further the process is carried, however, the more specific are the descriptions of elements of the ultimate product. These descriptions must then be stated as behavioral objectives for the student of teaching, and re-stated as the criteria for appraising the performances of teachers, or instructional managers.

The model then has identified the major elements of a teacher-education program. Each of the major elements, components of the ultimate product, must then be further analyzed, but we have identified a system which is a logical arrangement of our concepts about the instructional manager.

"Tasks" Become Systems Within the System

The goal of the whole model is to define a system which will produce instructional managers who elicit appropriate changes in pupil behavior. The strategies for moving students who are becoming instructional managers through a series of Tasks must be consistent with this broad goal. The test of the strategy for educating the student of teaching is that the student will demonstrate to criterion level the behaviors which were identified as evidence of the Effective Instructional Manager. The means for enabling students to demonstrate such behaviors in this model is a series of learning systems.

Prototype systems were developed at Washington State University in the fall of 1967. Two learning systems, one for the Task, stating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Objectives in Operational Terms, and one for the Task, Interacting With Pupils So That They Achieve the Objectives, are attached to this paper as Exhibits.* In a pilot test, 23 senior candidates for teaching certificates completed these and other systems. The staff was satisfied that most of the students reached a criterion level of performance for each of the systems. The systems need considerable revision, but they seemed to the staff of the project to demonstrate that an individualized approach to learning through a systems model was a feasible method of implementing behavioral objectives.

The model for a teacher education learning system consists of five elements:

1. A statement and explanation of the desired behavior
2. A procedure for assessing each learner's entry level in relation to the desired behavior
3. Alternative sequences of learning activities in which each learner either:
   (a) successively completes behaviors which constitute essential steps leading to the objective
   (b) demonstrates an advanced level of entry behavior, and consequently bypasses selected essential steps leading to the objective, or
   (c) demonstrates a deficiency and meets prerequisites to essential steps leading to the objectives.
4. A criterion task in which the learner demonstrates the behavioral objective in terms of a generalized performance standard
5. A second criterion task in which the learner demonstrates the behavioral objective in terms of <u>situation specific</u> performance standard.

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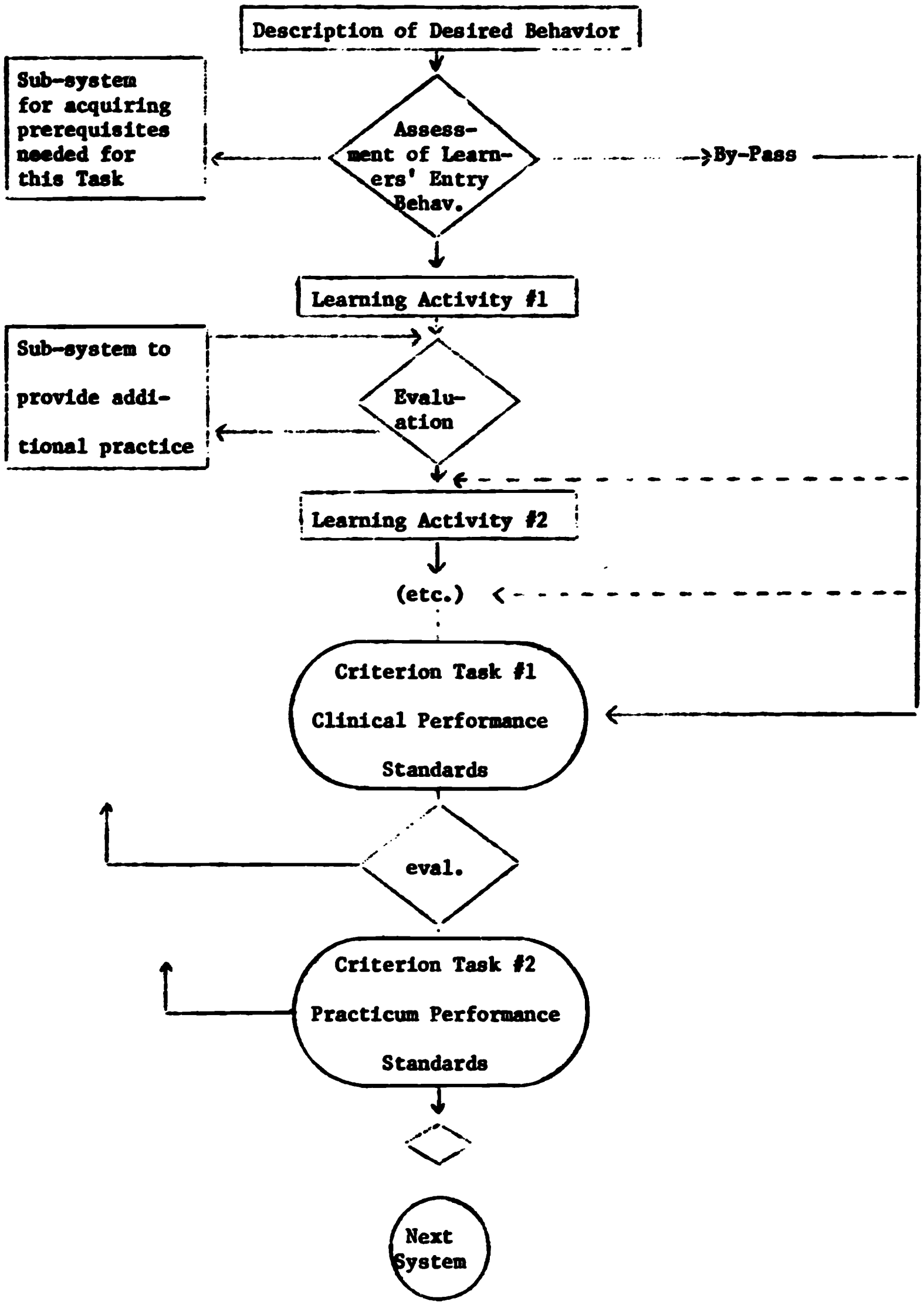
* The word, Tasks, is used in a slightly different sense in the attached Exhibits. Tasks as used in the learning systems would be sub-tasks to the Tasks described in this text.

SCHEMATIC DRAWING OF LEARNING SYSTEM



The sequence of learning activities which, in the schemtaic drawing, forms the middle track of the system consists of the components of the behavior described in the top box of the system. Within each learning activity, it is possible to define further sets of components. Future systems designers might devise learning materials which specifically fit the components within the defined learning activities. For the prototype models, available materials were adapted to fit the system. For example, the task force adapted books, films, video tapes and available programed materials for these rather primitive systems. The pilot study demonstrated that although there are many degrees of systematically applying the general concept, analysts can proceed with what is not available to implement a systematic demonstration of teaching behaviors by students. The systems approach is a way of looking at a process, and specific products of that approach probably have only temporary value and usefulness.

Performance Conditions for Teaching Behaviors

So far, the model describes the behavior of all instructional managers. The model fits those who work with young children as well as those who work with adults, those who address themselves to behaviors in mathematics or those who are concerned with literature; those who reinforce democratic attitudes or those who elicit autocratic attitudes. Except that we have examined the technical competencies of bringing about change, we have not spoken to the word, appropriate, in our definition of the Effective Instructional Manager--one who brings about <u>appropriate</u> changes.

In identifying Tasks in the model, we noted that each of these chunks of the general description of the desired behavior had a knowledge component and an application component. For each task, there is technical

knowledge which enables the student to apply the new behavior. The desired behavior for each task is really the demonstration by the student that he can apply the knowledge under both laboratory and practical conditions of teaching. For example, it is necessary to have knowledge <u>about</u> stating objectives behaviorally, but it is necessary to apply this knowledge <u>to</u> particular conditions. One cannot apply in general. In this model, the task force conceived of three conditions under which application of the behavior of the instructional manager must inevitably be demonstrated. These three conditions for application of teaching behavior are:

1. The instructional manager must apply the behavior (stating objectives, interacting with pupils, etc.) to a class of learner outcomes,

2. The instructional manager must apply the behavior to a particular content field,

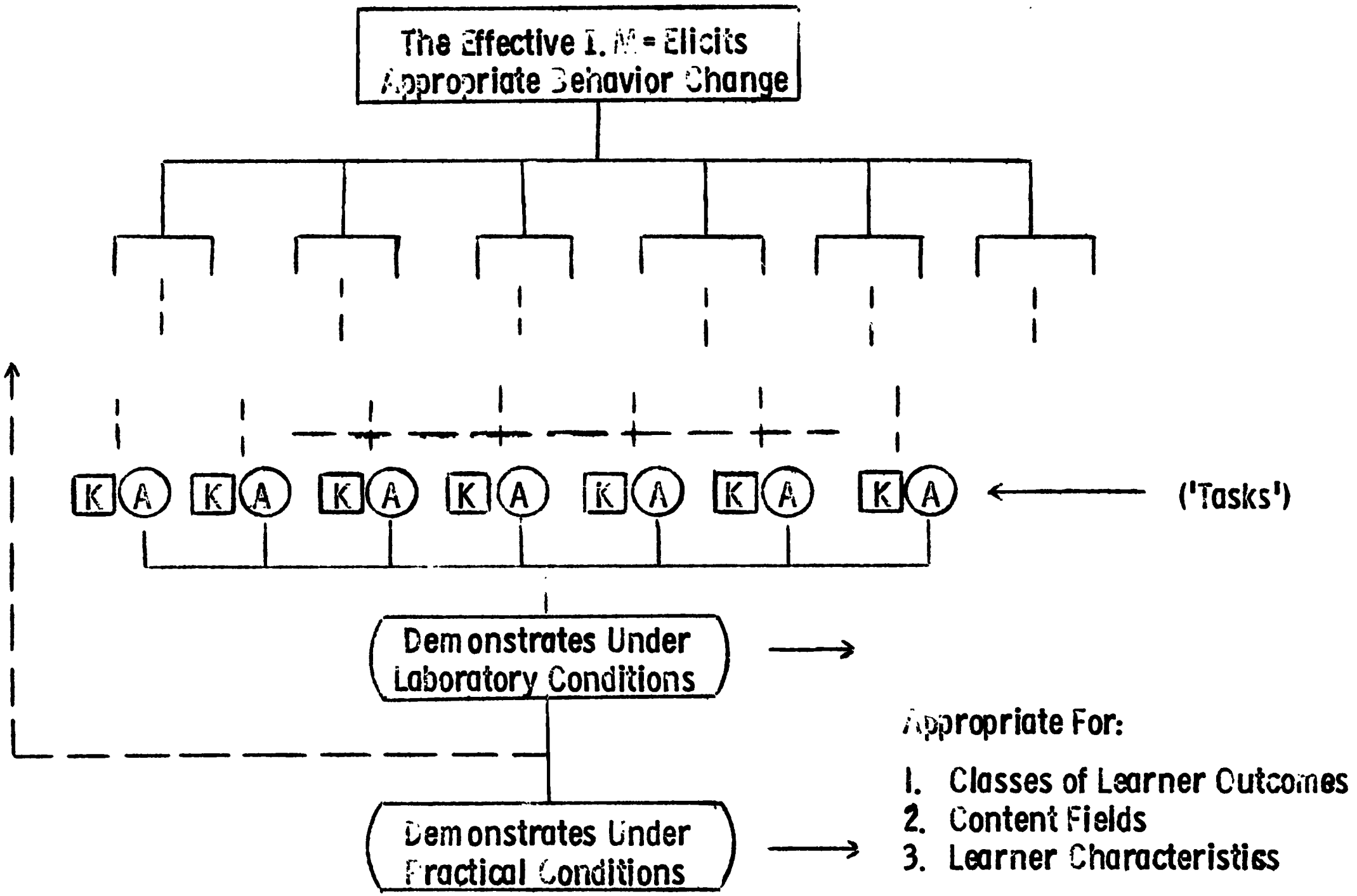
3. The instructional manager must apply the behavior to a particular combination or set of learner characteristics.

When the student, or the instructional manager, actually demonstrates the desired behavior he does so in each case with reference to these three conditions. Criteria relative to these conditions are additional criteria which are necessary for appraising that demonstration. The question of appropriateness of the desired change in behavior of pupils is defined by the criteria describing the class of learner outcome, the content and the characteristics of the learners.

For example, one task in the model is to state objectives behaviorally. We further describe the task by requiring that the objectives as stated are appropriate for (a) a particular class of learner outcomes (e.g. "comprehension" in the "cognitive domain" of the Taxonomy by Bloom, et. al.),

(b) for a particular content (e.g. Lewis Caroll's description of the Mad Hatter), and (c) for a particular set of learner characteristics (e.g. ten- and eleven-year old children living in Bellevue, Washington--an upper-middle class suburb).

Just as there are components of the behavior, stating objectives behaviorally, there are components of appropriateness for each of the three learning conditions prescribed in the model. The staff to date has not specified the components of each condition, but a first-level analysis suggests at this time that each condition can be separated into (a) the quality of being a fair example, or sample, or the universe for that condition, and (b) the quality of being a significant example. The first component of the criterion is mainly a function of technical competence and the second component is mainly a function of value judgement. Our model then has this appearance:


The Effective I. M. = Elicits Appropriate Behavior Change
K A K A K A K A K A K A K A
('Tasks')
Demonstrates Under Laboratory Conditions
Demonstrates Under Practical Conditions
Appropriate For:
1. Classes of Learner Outcomes
2. Content Fields
3. Learner Characteristics

Another way of describing the model is that the entire plan for enabling students to demonstrate the behavior of an Effective Instructional Manager is to break out manageable pieces of this total behavior, restate these manageable pieces as behavioral objectives in which the student applies the piece of behavior, and in applying the behavior meets three types of performance standards.

Requirements for Evaluating Instructional Management

Ultimately the student puts together all the pieces and demonstrates the total behavior under practical teaching-learning conditions. This is synthesis. The result of this synthesis we have already said, seldom will have the appearance of being systematic. Evaluation of the practice of the instructional manager is again a process of analysis, taking apart the practical demonstration and appraising the several components. The instrument for appraisal will consist of the components stated as criteria, together with criteria having to do with the three conditions under which each component is demonstrated.

If the evaluation process of a practical demonstration seems complex, it seems that way because it is. The model, however, is only an attempt to describe in systematic terms what is the reality of being an instructional manager.

A particular evaluation instrument based on this model may have only one, or seven, or fourteen sets of criteria--depending upon what appears to be manageable to the person doing the evaluation.

Different competencies are required for appraising behaviors in terms of the three conditions for judging the appropriateness of the behavior. Competency in educational psychology may be necessary to appraise appropriateness in terms of learner outcomes. (In the model, classes of

learner outcomes are the six levels of cognitive behavior, the six levels of affective behavior, the six levels of psycho-motor behavior, divergent as contrasted to covergent modes of thinking, and self-awareness.) Obviously to appraise the appropriateness of pupil and teacher behaviors to a content field requires knowledge in that particular content field. The judge of appropriateness for learner characteristics probably will have to be one who can apply the field of knowledge concerning human development, and who is intimately acquainted with the characteristics of the unique group of learners who will be the pupils for a specific application. The person who should possess all these competencies, of course, is the instructional manager.

In the model we have been discussing, it appears that it will be necessary to develop three sets of enabling learning systems. These will enable the student to demonstrate the knowledge necessary to apply the behavior of the Effective Instructional Manager for the three sets of performance conditions.

Methods of Evaluation

This model of the Effective Instructional Manager requires two different approaches to evaluation. First, the problem is to determine whether or not the student who is becoming an Effective Instructional Manager performs to criterion level. Later, the problem is to assess what level of performance, in terms of a range of levels, has been attained by the practicing instructional manager. For the student this initial appraisal may by of performances made under laboratory conditions, while later the appraisal will be made of performances under practical conditions. Under laboratory conditions, the student will demonstrate a piece of the total behavior of the instructional manager, and the instructional manager

in practice demonstrates the whole behavior. It follows that the instruments and means for evaluating laboratory performances will be different from those for evaluating practice by instructional managers. The differences will be that the laboratory assessment may be more specific and more detailed than the practical assessment. Again, this is a matter of how far we wish to carry the analysis process.

Evaluation of Performance Under Laboratory Conditions

The criteria for evaluating a laboratory demonstration by a student instructional manager are the components of that performance which is being demonstrated. In the model, this performance is what we dalled a Task. If the total behavior of the Effective Instructional Manager is broken into manageable "chunks" when we identify Tasks, then these chunks are in turn broken into "pieces" to identify learning activities, and these pieces become "bits" when the particular steps leading the student through the system are defined. The criteria for appraising laboratory demonstrations of "chunks" then would be based upon "pieces" and "bits". The criteria for appraising the practical instructional manager would be "chunks" and "pieces".

Different behaviors demonstrated under laboratory conditions require different means of assessment. For example, the student demonstrating his ability to write a behavioral objective writes an objective. This is appraised by reading the objective and comparing it to the four criteria which define the behavioral quality of such objectives, and further judged as being appropriate for a class of learner outcomes, a content area, and a set of learner characteristics. In another set of tasks, the student is required to elicit responses from pupils and reinforce them appropriately (Exhibit B, Tasks 18-22). In one particular

application of this task, the student is to assign a piece of work to students and establish a favorable set on their part for doing the work (Task 18 in Exhibit B). This application requires the student to elicit two classes of learner outcomes--comprehension of the assignment (cognitive behavior), and willingness to undertake the assignment (affective behavior). In the pilot study where this learning system was field tested, the staff identified seven components of the interaction behavior to be carried out by the student. These seven components became essential elements in the learning system for the student instructional manager, seven elements in the student's instructional strategy, and seven criteria for appraising the performance of the students with pupils in a laboratory situation. In actually assessing each of the seven criteria, coaches judged the student also in reference to the three classes of learning conditions already described. These two examples illustrate that the nature of the evaluation technique depends upon the nature of the criteria.

In the learning system context, the appraisal of the student is often a "go, or no'go" kind of judgement. The student reached criterion level of performance or didn't. The instrument for evaluation is usually different for each of the tasks which is to be judged in the teacher education laboratory.

Evaluation of Performance Under Practical Conditions

The reason for not judging performances of practicing instructional managers the same way as we judge the student in the teaching laboratory is merely that the same highly specific criteria and instrumentation just aren't possible to apply to typical situations. One difference in evaluation technique is that larger components of the behavior of the instructional manager serve as criteria. Another difference in technique resul-

from the assumption that practicing instructional managers can improve their competencies as they gain experience and as they study their techniques. Therefore the judge looks for different levels of performance among instructional managers rather than simply deciding whether or not a particular minimum standard of performance is demonstrated.

As we have already noted, teaching behaviors occur rapidly and the problem of observing and recording these behaviors is such that only fairly gross judgements of rather general criteria seem possible. A great many techniques have been developed over the years for making these kinds of observations. Perhaps every supervisor of student teachers has at one time or another devised his own instrument and method of making and recording observations about teaching performances.

The particular appraisal technique to be used for the model described in this paper was used in an experimental study which was concerned with effects of modivied internship programs upon performances of beginning elementary teachers.[4] The approach developed in that study can be adapted to the criteria which have been identified in this model. The appraisal technique was developed largely by Harry L. Garrison, first in working with the Stanford Appraisal Form, and later with the Seattle Teaching Performance Appraisal Guide. The latter is Appendix I.

The method for evaluation developed for both the Stanford and the Seattle Appraisal forms is based upon observations of different aspects of what is assumed to be the teaching act. The person who does the observation is first trained by practicing with the appraisal form in appraising teachers who are experienced and teachers who are inexperienced. Both live performances and video tapes we've used as models. The purpose of the training was to be able to identify the presence or absence of different elements in the teaching act and to gain some mental models of

different criterion levels of performance of this teaching act. Then when the observer appraised a particular teaching performance he noted different behaviors by the teacher and made a judgement as to the relative quality of that performance compared to his view of the total possible range of performances. This judgement is on a seven-point scale, weighted to offset a bias by the observer which would likely result in scores clustering at the upper end of the seven-point scale.

Criteria used to appraise the teaching act in the Seattle Appraisal Form did not include criteria for evaluating teaching behavior with reference to content, learner characteristics or classes of learner outcome.

In the Beginning Teacher Study, nine observers were trained to use the Seattle Appraisal Form. They then appraised the performance of 120 beginning elementary teachers on four different occasions. Observers visited beginning teachers' classrooms in teams of three, but each observer made independent appraisals. The membership of each team was rotated for each of the four series of visits.

Experience with this technique in the study indicated that independent observers do seem to perceive the same criterion levels of teaching behavior when using this technique. The research staff found that the observers needed re-training from time to time. The more the observer used the technique, the more his observations were likely to differ from another observer's. Apparently, observers need frequent renewal of the mental models of different criterion levels of performance. Also, not all the nine observers were equally consistent with other observers in their judgements. Apparently there was some kind of interaction between instrument and observer, and some personal characteristics of observers, not known to the research staff, accounted for these inconsistencies. The most consistent observers were substitute teachers. The least consistent

observers were supervisors of student teachers.

An adaptation of the Seattle Appraisal Form, using the criteria identified by the analysis techniques described in this paper, has been tried out as a part of the pilot study with 28 seniors from Washington State University, interning in the Bellevue School District of Washington. The major components of the behavior of the Effective Instructional Manager are being tested as the categories for appraising the performances of the 28 interns. Further specifics for making judgements of these categories are defined by grouping the second- and third-level analysis components within these criteria. The form, like the Seattle Appraisal Form, does not deal specifically with the three conditions for judging appropriateness. At this time, in the pilot study, different judges, competent with respect to content and learner characteristics, appraise different interns. That is, an English teacher appraised the performances of the intern in that field; a mathematics teacher used the experimental form to appraise behaviors of the mathematics intern. In the laboratory, demonstrations by the 28 interns in the pilot study are judged by methods teachers or graduate students with experience in the appropriate content field. In the practical demonstrations in Bellevue Schools, selected experienced teachers made the evaluations. In the first situation, the judges appraise the performances with reference to a "set" of learner characteristics, and in the practical demonstration the judges appraise the performance in terms of the requirements of a unique group of learners.

One major problem in evaluation is the absence of models of different criterion levels of performance for different teaching behaviors. A project to produce a series of video tapes is a side study of the Bellevue, Washington pilot study. Video tapes of the 28 students under laboratory conditions are being augmented by video tapes of the same students per-

forming the same demonstrations but after some practice as interns. The students will be taped again during their first year of teaching to obtain a third sample of the same teaching behavior. Hopefully, these tapes will result in sets of three tapes for different performances, and the set of three tapes will clearly show a minimum level, an improved level, and a superior level of performance by the same instructional manager of the same behavior.

Ultimately the instructional manager himself is the person most concerned with his own evaluation. Video-taped recordings, comments on a tested instrument written by a trained observer, or audio tapes are each different means of supplying a mirror of the performance for self evaluation.

The method of evaluation of the instructional manager which is being tested for the model described in this paper is still developing. No satisfactory method has yet been devised for judging both the general techniques of all instructional managers, and at the same time specific applications to the three sets of performance conditions. The systematic analysis of "eliciting appropriate changes in behavior of learners" identifies all the components and all the criteria for evaluation. Whatever we finally do to evaluate instructional management must deal with all these elements, or specifically exclude some of them.

Summary

The approach taken in this paper to teacher education and the evaluation of teaching results from a logical analysis of the defined purpose of teaching. The purpose of teaching is assumed to be that it should bring about learning. Learning is defined as appropriate changes in the behavior of learners. Behavior encompasses all of the kinds of activity of which

the human organism is capable--thinking, acting, feeling. A more refined statement of the objective of teaching is that it should bring about appropriate changes in learners.

A logical analysis of this purpose should result in the identification of the elements of the behavior bringing about appropriate changes. These elements are at the same time the logical objectives for a program of teacher education and the criteria for assessing the effectiveness of the teacher.

The process of analysis is a process of taking apart. If the process is systematic, it will identify all the components of the desired behavior of teachers and the relationships of these components. The discipline of systematic analysis requires that each time an analyst takes apart an element of the total behavior, he should define the largest, meaningful components he can perceive. By successively defining the largest, meaningful components at each stage of analysis, the analyst insures that he will define all the components he can conceptualize and identify all the possible relationships of these components.

The more one breaks out levels of analysis--takes apart--the smaller are the parts of the total behavior. The smaller the components become, the more specific are the objectives of teacher education and the criteria for evaluating teaching. At each level of analysis, all the components at that level describe the total behavior described in the original purpose of teaching. Analysts--teacher educators and teaching evaluators--decide subjectively that the process of taking apart has gone far enough when further analysis does not seem to justify the costs and efforts.

The logical strategy for enabling future teachers to demonstrate the behaviors of the Effective Instructional Manager is to devise learning systems for each significant piece of the total behavior. These learning

systems are systems within the total system for defining teacher education objectives and criteria.

The means for making judgements about particular performances by the teacher is to observe how the behavior of the teacher compares to the criteria which have been identified by systematic analysis of the teaching act.

We conceive of this total model of defining objectives, criteria and learning systems for teacher education as a system. A system must always have a self-correction capability. In this system, the analyst continually re-examines the judgements he makes as he defines objectives and criteria.

Finally, the total system for teacher education must be evaluated. Do we really value the logical product of the system? Do we really want to educate instructional managers who effectively bring about changes in the behavior of learners? Does it matter what the particular behavior of that instructional manager is like if it elicits the desired change in pupil behavior? History seems to suggest that the rare individual who really does change the behavior of others in significant respects is usually severely punished for his trouble.

References

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